

**AMENDMENTS TO THE SPECIFICATION**

**Please replace the paragraph beginning at page 17, lines 11-26 with the following amended paragraph:**

The binary image generating means 2 reads out the threshold values stored in the main storage and reads out the image data P from the hard disk of the radiation image read-out apparatus ~~by~~ way of a network. Then the binary image generating means 2 carries out binary-coding processing on the image data P on the basis of the threshold values, thereby generating binary images where pixels having a pixel value not smaller than the threshold value are displayed in white and pixels having a pixel value smaller than the threshold value are displayed in black. (step #2) The radiation image data P may be read out from an auxiliary storage of the prospective abnormal shadow detecting system X. The binary-coding processing may be performed so that pixels having a pixel value higher than the threshold value are displayed in white and pixels having a pixel value not higher than the threshold value are displayed in black.

**Please replace the paragraph beginning at page 18, line 9 through page 19, line 19 with the following amended paragraph**

It has been empirically found that when the radius of a circle approximating a primary-label region is too small (e.g., not larger than 0.15cm) or too large (e.g., not smaller than 2.5cm), the primary-label region cannot be an abnormal shadow. Accordingly, it is preferred that primary-label regions which are too small or too large in the radius of a circle approximating a primary-label region be eliminated in advance. The radius  $r$  of a circle approximating a

calculated according to the following formula (1) on the basis of the area Area of the primary-label region.

$$r = \sqrt{\frac{Area}{\pi}} \dots (1)$$

Further, it is preferred that primary-label regions which are in the pectoral muscle area or the nipple area be eliminated in advance. The pectoral muscle area can be detected in a known manner. See, for instance, "Chibusa X-sen gazoni okeru kyokinryoikino jido chushutu (Automatic Extraction of Pectoral Muscle Area in Breast X-Ray)", Denshi/Joho/tushin gakkai Ronbunshi (Journal of Electronics/Information/Communication society), MI2000-78, pp.5-10, 2001 Jan.) The nipple area can be detected on the basis of medical recognition that the nipple area is at a distance of not larger than 2cm from the uppermost position of the breast area. Position of each primary-label region is represented by the center of gravity of brightness G(x, y) thereof defined by the following formula (2) when (xi, yi) represents coordinates of each point in the primary-label region and pi represents the pixel value of each point in the primary-label region.

$$x = \frac{\sum_{i \in R} x_i p_i}{\sum_{i \in R} p_i}, \quad y = \frac{\sum_{i \in R} y_i p_i}{\sum_{i \in R} p_i} \dots (2)$$

wherein (x, y) represents the coordinates of the center of gravity of brightness G of the primary-label region, (xi, yi) represents coordinates of each point in the primary-label region, ~~pi~~  
~~represents~~ P<sub>i</sub> represents the pixel value of each point in the primary-label region and R represents the primary-label region.

**Please replace the paragraph beginning at page 20, lines 12-19 with the following amended paragraph**

The weight to be applied to the size is obtained according to the relation between the size of the primary-label region and the weight applied to the size of the primary-label region shown in Figure 5. The size of the primary-label region is represented by the diameter  $(2r)$  (calculated by  $2*r$ , where "r" stands for radius) of a circle approximating the primary-label region. The relation shown in Figure 5 has been empirically obtained through analysis of actual growth shadows.

**Please replace the paragraph beginning at page 32, line 1 through page 33, line 2 with the following amended paragraph**

In the case where the radiation image data P is obtained in a manner different from the above embodiment, for instance, where the image data is obtained so that the pixel value is increased with increase in radiation energy in the position corresponding to the pixel and the pixels are displayed less bright (higher in density) as the pixel value is increased, the description of this specification should be reread with the relation between the pixel values reversed. That is, the binary image generating means 2 generates binary images where pixels having a pixel value not lower than the threshold value are displayed in white and pixels having a pixel value higher than the threshold value are displayed in black and the primary-label region extracting means 3 extracts as a primary-label region at least one region of an aggregate of white pixels in each of the generated binary images. The center of gravity of brightness G can be calculated

according to a formula obtained by substituting  $\underline{p_i}$  in formula (2) by  $\underline{q_i}$  defined by the following formula (5) or (5)'

$$q_i = P - p_i \quad \dots (5)$$

$$q_i = \frac{1}{p_i} \quad \dots (5)'$$

wherein  $q_i$  represents an index having positive correlation with the brightness,  $\underline{p_i}$  represents the pixel value of each point in the primary-label region and P represents a constant. Generally, the constant P is the maximum value of the pixel value which theoretically the pixel value can take, e.g., in the case where the density resolution is of 10bits (0 to 1023),  $P=1023$ .